

SSVEO IFA List

Date:02/27/2003

STS - 86, OV - 104, Atlantis (20)

Time:03:58:PM

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 1	MET: 000:00:01	Problem	FIAR	IFA STS-86-V-01 FCP
EGIL-01	GMT: 269:02:35		SPR	UA
			IPR 92V-0001	PR
				Manager: Lloyd Mustin
				562-922-2587
				Engineer: Ray Gonzales

Title: Fuel Cell 2 Substack 1 Delta Volts Transient (ORB)

Summary: Starting at about 269:02:35:21 G.m.t. (000:00:01:02 MET), the fuel cell 2 substack 1 cell performance monitor (CPM) delta voltage output exhibited an unusual increase. The substack 1 delta volts increased into the 300 to 500 mV range for a period of about 15 seconds (500 mV for 2 seconds), then decreased into the 100 to 200 mV range for about 20 seconds. The entire event last about 1 minute and the substack 1 delta volts reading prior to and after the event was in the 6 to 8 mV range. During this event, no anomalous indications were seen in the fuel cell 2 substack 2 or 3 delta voltage indications and no other fuel cell parameters indicated that there was a fuel cell problem.

Because of this ascent event, main buses A and B were bus tied at 269:02:46 G.m.t. (000:00:11 MET) and, as a precaution, they remained tied until deorbit preparations. After the first landing attempt was waved-off, the buses were re-tied and the tie was broken during the following day's deorbit preparations. The CPM performed nominally for the remainder of the mission and the fuel cell 2 substack 1 delta voltage remained in the 2 to 8 mV range. The data indicate that this event was most probably caused by an instrumentation problem, and was not the result of a physical or chemical problem within the substack. An instrumentation test was performed on the vehicle. The test consisted of wire wiggles to check the instrumentation string from FC 2 to MDM OF1. The anomaly was not duplicated. As a result, the fuel cell, which had been removed from OV-104 for OMDP (as planned), will be returned to IFC for instrumentation testing. That testing will focus on a potential loose wire between the substack (pins 1 and 17) and the CPM or the CPM itself.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 2	MET: 000:00:09	Problem	FIAR	IFA STS-86-V-02 RCS
PROP-01	GMT: 269:02:43		SPR	UA
			IPR 92V-0009	PR
				Manager: Samuel Jones
				x39031

Engineer: Steve Arrieta
x36435

Title: Primary Thruster L3D Failed Off (ORB)

Summary: Primary RCS thruster L3D failed off during its first commanded firing following external tank (ET) separation. During the firing, the chamber pressure did not rise above 4 psia and the thruster was deselected due to this low Pc indication. The thruster was not used during the remainder of the mission.

The L3D injector temperature data profile was indicative of a normal firing suggesting that the thruster did in fact fire. The data also showed that the L3D chamber pressure (Pc) slowly decreased from approximately 18 psia to 4 psia over a seven minute period during ascent, whereas the drop should have occurred in approximately 1.5 minutes. Note that even though the 18 psia ground indication was higher than normal, it was discounted as a problem because it appeared to be an instrumentation bias and the LCC allows ambient +/- 10 psia. The indicated L3D Pc remained in the 3 to 4 psia range throughout the mission indicating that there was a bias in the measurement. Following landing, the L3D Pc remained at 4 psia for just over 1 hour, after which it slowly rose to approximately 15 psia over an 18 minute period. The data from ascent and entry and the fail-off during the ET separation firing may be the result of a plugged Pc tube. KSC will perform a borescope inspection of the thruster chamber. Since OV-104 is going to OMDP, LP03 has been removed and sent to the HMF for its OMDP and the inspection will be done there (11/97). All thrusters are scheduled to be removed and sent to the WSTF for normal OMDP processing. Therefore, any additional investigation of this failure that may be necessary will be performed at the WSTF.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>
MER - 14	MET: 005:19:29	Problem	FIAR	IFA STS-86-V-03
MMACS-02	GMT: 274:22:04		SPR	UA
			IPR	PR
				Manager: Tibor Farkas
				562-922-4487
				Engineer: Walter Scott

Title: APU 2 Gas Generator Bed Heater B High Cycle Frequency (ORB)

Summary: Following APU heater reconfiguration, the APU 2 gas generator (GG) bed system B heater cycled at a high frequency. Proper GG bed temperature (V46T0222A) was maintained in the nominal 360 to 425 °F control band. As a result of the high frequency cycling, the injector temperature (V46T0274A) remained nearly constant at 359 °F following the heater reconfiguration.

A signature similar to the one seen on this mission has been seen previously on this APU (s/n 402). It is believed to be caused by the GG bed temperature sensor, which is used by the APU controller to control the heater, being very close to the B heater. This results in very frequent heater cycling and a dithering appearance in the injector temperature. This frequency has increased since it was first noted on STS-50 (7 flights). The APUs were previously scheduled to be removed after this flight (OV-104 OMDP) and returned to Sundstrand. Special testing will be performed on the heater to determine the cause of this signature. It will then be determined if corrective action

is required.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>	
MER - 10	MET: 002:17:53	Problem	FIAR	IFA STS-86-V-04	D&C
EGIL-02	GMT: 271:20:28:00		SPR	UA	Manager: Dennis Gaspar
			IPR 92V-0002	PR	562-922-0047
					Engineer: Andy Farkas

Title: Forward Starboard Floodlight Failed to Illuminate (ORB)

Summary: The forward payload bay floodlights were powered on at approximately 271:20:28 G.m.t. (002:17:53 MET). The forward starboard floodlight (no. 2) failed to illuminate. The crew confirmed that the starboard floodlight was not illuminated but the port floodlight was. A data plot of the mid main B currents indicated no signature of the floodlight activation. A 1.5 amp increase indicative of the FEA current draw was seen. The crew cycled the forward starboard floodlight switch and the data again showed no signature of the floodlight turning on. The floodlight had been used successfully during PLBD opening. Floodlights 1 through 5 are the new design. FEA 2, which powers floodlight 2, is also the new design.

KSC did a visual inspection of the floodlight and found a cracked bulb. The floodlight will be replaced and TT&E will be performed.

<u>Tracking No</u>	<u>Time</u>	<u>Classification</u>	<u>Documentation</u>	<u>Subsystem</u>	
MER - 13	MET: 006:00:06	Problem	FIAR	IFA STS-86-V-05	ECLSS
EECOM-01	GMT: 275:02:40		SPR	UA	Manager: Don
			IPR	PR	Sandersfeld
					562-922-3772
					Engineer: Isaac Andu
					x39324

Title: PCS 1 14.7 psia Regulator Early Flow Termination (ORB)

Summary: A repressurization of the combined Orbiter/Mir stack was started at 275:01:52 G.m.t. (005:23:18 MET) using PCS 1 providing N2 and PCS 2 providing O2. The initial pressure was approximately 12.6 psia. The N2 flow rate began to rapidly decrease 43 minutes later, with the cabin pressure at approximately 14.3 psia, as the regulator transitioned from high to low flow (should occur at 14.6 psia). The repressurization was terminated by the crew at 275:02:40 G.m.t. (006:00:05 MET). The crew reported that ice had formed on the pressure control system panel. Following a crew sleep period, the stack repressurization resumed at 275:13:02 (006:10:28 MET) using PCS 2. This repressurization was nominally completed in 32 minutes with the pressure increasing to 14.62 psia, which is the control pressure for this PCS 2 14.7 psia

(cabin) regulator. The PCS 1 regulator was then enabled at 275:13:34 G.m.t. (006:11:00 MET) and the repressurization continued nominally to 14.7 psia, which is the control pressure for this PCS 1 14.7 psia regulator.

It is believed that chilling of the regulator as a result of the long duration high flow (~187 lb/hr) caused the early transition from high to low flow. At the time of the event, the N2 supply tank temperatures were in the -10 to -50 °F range. Two possible explanations have been given for the early transition. The first is that the bellows in the high flow portion of the regulator lost elasticity at the low temperatures which caused the poppet to return to its original (closed) position. The second is that chilling of the reference chamber in the low flow portion of the regulator caused the regulator set point to change. A postflight N2 sample was taken from the vehicle and analyzed. The moisture content was 2 ppm (same as measured for the load), which is well below the 11.5 ppm maximum specification. A request was also made to verify the high flow capability of the regulator (scheduled for the week of 11/3). This request was included in chit J5081 identifying ECLSS work to be performed prior to OV-104 being ferried to Palmdale. Also, testing will be performed at JSC to better understand the failure/capability of the cabin regulators and to verify the emergency capability of the 8 psia regulators.

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MER - 15	MET: 009:19:25	Problem	FIAR	IFA STS-86-V-06 HYD
MMACS-03	GMT: 278:21:59		SPR IPR	UA UA-4-A0039 PR Manager: Bill VanMeter 562-922-2228 Engineer: J. Wiltz x39009

Title: WSB 3 Vent Heater Failure on the B Controller (ORB)

Summary: At 278:21:59 G.m.t. (009:19:25 MET), during the time period between the first and second landing opportunities, the WSB 3 vent temperature number 2 (V58T0366A) went off scale low (122 °F). Nominally, the vent heater should have cycled back on at around 145 °F. The system was operating on the B controller at the time, and this signature indicated that the B heater had failed off. The system was switched to the WSB 3 A controller at 278:22:28 G.m.t. (009:19:54 MET) and a rise in vent temperature was observed a short time later. Nominal cycling of the system A vent heater was observed. The B vent heater was tried again following the waved-off entry attempt and on entry day. In both instances, the B vent heater remained failed.

This problem also occurred just prior to STS-76's entry deorbit burn, when the WSB 3 vent temperature went off scale low with WSB 3 on the B controller. The system was switched to the WSB 3 A controller and a rise in vent temperature was observed a short time later. In order to better characterize the problem, after about 30 minutes and nominal heater cycles on the A controller, the system was switched back to the B controller. Nominal cycling of the B vent heater was observed for the remainder of

the flight. The problem was not found during post-flight troubleshooting and was flown as-is. The problem had not repeated until this STS-86 occurrence. KSC activated the heater and verified that it was still failed. Troubleshooting on this problem will be performed when the vehicle is at Palmdale.
